Claims

[c1]   1. A method OLE_LINK1of blending a plurality of compo-
nents to produce a product having a plurality of target
properties, each of said plurality of components impact-
ing one or more of said plurality of target properties
when blended, wherein a first component comprised in
said plurality of components being scheduled to be
available only at a time instance during blending,
OLE_LINK1said method comprising:

receiving in a digital processing system data indicating
said plurality of target properties, the manner in which
each of said plurality of components impacts any of said
plurality of target properties, an aggregate volume of
said product to be produced;

determining in said digital processing system an inter-
mediate blend point at or after said time instance such
that a corresponding intermediate properties combina-
tion can be attained at said intermediate blend point and
said plurality of target properties can be attained from
said intermediate blend point; and

controlling flow rates of each of said plurality of compo-
nents to attain said intermediate properties combination
before said first component becomes available, and to

attain said plurality of target properties from said inter-mediate properties combination after said first compo-nent becomes available, whereby said product of said aggregate volume is generated by blending said plurality of components.

[c2]   2. The method of claim 1, wherein said determining de-termines said intermediate blend point to meet a desired criteria.

[c3]   3. The method of claim 2, wherein said desired criteria comprises minimizing total cost of said plurality of com-ponents blended to produce said product.

[c4]   4. The method of claim 1, wherein each of said plurality of components are provided for blending by a corre-sponding plurality of outlets, wherein each of a plurality of source controllers control the flow rate of a corre-sponding one of said plurality of outlets, said method further comprises:

determining in said digital processing system each of a first plurality flow rates for a corresponding one of each of said plurality of components before said intermediate blend point such that said intermediate properties com-bination is attained for said product at said intermediate blend point;

determining in said digital processing system each of a

second plurality flow rates for a corresponding one of each of said plurality of components after said intermediate blend point such that said plurality of target properties are attained for said product after said intermediate blend point,

wherein said controlling is performed by operating said plurality of outlets according to said first plurality of flow rates and said second plurality of flow rates.

[c5]   5. The method of claim 1, wherein said determining comprises:

computing using said digital processing system a plurality of ideal volumes corresponding to said plurality of components which would be blended if said first component were to be available during entire blend duration, wherein said plurality of ideal volumes includes a first ideal volume for said first component;

assigning said first ideal volume to a temporary variable;

searching whether one or more of said intermediate blend points are feasible with said temporary variable as volume for said first component;

if one or more of said intermediate blend points are feasible, said controlling using one of said one or more intermediate blend points to control flow rates of said plurality of components; and

if any of said intermediate blend points is not feasible,

decreasing said temporary variable by an amount and performing said searching.

[c6]   6. The method of claim 5, wherein said finding finds said one or more intermediate blend points consistent with a plurality of constraints posed by a manufacturing plant.

[c7]   7. The method of claim 1, wherein said method is performed in an oil refinery.

[c8]   8. A computer readable medium carrying one or more sequences of instructions for causing a computer system to support blending of a plurality of components to produce a product having a plurality of target properties, each of said plurality of components affecting one or more of said plurality of target properties when blended, a first component being scheduled to be available only at a time instance during blending, wherein said first component is comprised in said plurality of components, wherein execution of said one or more sequences of instructions by one or more processors contained in said computer system causes said one or more processors to perform the actions of:
receiving data indicating said plurality of target properties, the manner in which each of said plurality of components affects any of said plurality of target properties, said time instance, an aggregate volume of said product

to be produced; and

determining an intermediate blend point at or after said time instance such that a corresponding intermediate properties combination can be attained at said intermediate blend point and said plurality of target properties can be attained from said intermediate blend point, wherein flow rates of each of said plurality of components are controlled to attain said intermediate properties combination before said first component becomes available, and to attain said plurality of target properties from said intermediate properties combination after said first component becomes available, whereby said product of said aggregate volume is generated by blending said plurality of components.

[c9] 9. The computer readable medium of claim 8, wherein said determining determines said intermediate blend point to meet a desired criteria.

[c10] 10. The computer readable medium of claim 9, wherein said desired criteria comprises minimizing total cost of said plurality of components blended to produce said product.

[c11] 11. The computer readable medium of claim 8, wherein each of said plurality of components are provided for blending by a corresponding plurality of outlets, wherein

each of a plurality of source controllers control the flow rate of a corresponding one of said plurality of outlets, further comprises:

determining in said computer system each of a first plurality flow rates for a corresponding one of each of said plurality of components before said intermediate blend point such that said intermediate properties combination is attained for said product at said intermediate blend point;

determining in said computer system each of a second plurality flow rates for a corresponding one of each of said plurality of components after said intermediate blend point such that said plurality of target properties are attained for said product after said intermediate blend point,

wherein said controlling is performed by operating said plurality of outlets according to said first plurality of flow rates and said second plurality of flow rates.

[c12]   12. The computer readable medium of claim 8, wherein said determining comprises:

computing a plurality of ideal volumes corresponding to said plurality of components which would be blended if said first component were to be available during entire blend duration, wherein said plurality of ideal volumes includes a first ideal volume for said first component;

setting a temporary variable equal to said first ideal volume;

finding whether one or more of said intermediate blend points are possible with said temporary variable as volume for said first component;

if one or more of said intermediate blend points are possible, using one of said one or more intermediate blend points to control flow rates of said plurality of components; and

if one or more of said intermediate blend points are not possible, decreasing said temporary variable by an amount and performing said finding.

[c13]   13. The computer readable medium of claim 12, wherein said finding finds said one or more intermediate blend points consistent with a plurality of constraints posed by a manufacturing plant.

[c14]   14. A manufacturing plant for blending a plurality of components to produce a product having a plurality of target properties, each of said plurality of components affecting one or more of said plurality of target properties when blended, a first component being scheduled to be available only at a time instance during blending, wherein said first component is comprised in said plurality of components, said manufacturing plant comprising:

a blender;

a plurality of outlets, wherein each of said plurality of outlets provides a corresponding one of said plurality of components according to a corresponding flow rate for blending by said blender;

a plurality of source controllers, wherein each of said plurality of source controllers controls the flow rate of a corresponding one of said plurality of outlets; and

a blend controller determining the flow rate for each of said plurality of source controllers, said blend controller operable to:

receive data indicating said plurality of target properties, the manner in which each of said plurality of components affects any of said plurality of target properties, said time instance, an aggregate volume of said product to be produced;

determine an intermediate blend point at or after said time instance such that a corresponding intermediate properties combination can be attained at said intermediate blend point and said plurality of target properties can be attained from said intermediate blend point; and

control flow rates of each of said plurality of components to attain said intermediate properties combination before said first component becomes available, and to attain said plurality of target properties from said intermediate properties combination after said first component becomes available, whereby said product of said aggre-

gate volume is generated by blending said plurality of components.